

slope gradient and distance thresholds for SSS. Otherwise, the presence and abundance of existing landslides and headwall swale landforms, which is a function of geologic conditions and natural landscape variability, will determine the use of the Plan's conservation measures.

Response to Comment S5-103

The Services considered, but rejected, the suggestion to require forensic analysis. The measures contained in the Plan are sufficient to qualify for approval. The Services do not believe it necessary to require forensic analysis following such an event. The Plan contains adequate provisions to address any uncertainty as to causation.

Response to Comment S5-104

AHCP/CCAA Appendix F1, sections F1.2.1.4, F1.2.1.5, and F1.2.1.6 present a discussion of the relative effects of different silvicultural systems on slope stability. These sections also discuss and tabulate for comparison the results of various studies of the effects of tree harvesting on slope stability in various geologic settings.

Response to Comment S5-105

Due to the complexity of geologic conditions and processes in the Plan Area, it is not practical to test the stated assumptions for hillslope evaluation prior to Plan implementation. These assumptions, as well as existing research, will be tested through the 20 year Mass Wasting Assessment (MWA) (AHCP/CCAA Section 6.2.5.3.4). The MWA will be conducted as described in AHCP/CCAA Appendix D.3.5. In addition, there are provisions in the Plan to make adjustments to the SSS conservation measures within the first 7 years and after the first 15 years of the Plan as necessary through the SSS delineation study (AHCP/CCAA Appendix D.3.3), the SSS Assessment (AHCP/CCAA Appendix D.3.4) and adaptive management (AHCP/CCAA Sections 6.2.6, 6.3.6) within the limits of the AMRA.

Response to Comment S5-106

The specific concerns of the comment are addressed correspondingly by the following numbered items.

- 1) Differentiating MWPZs by geology type may be accomplished

S5-103

We recommend that Simpson conduct forensic analysis on known failures at this time and use this data to develop meaningful prescriptions that prevent catastrophic failures and aquatic habitat destruction.

S5-104

77. Page 6-74. The HCP discusses slope stability measures and states that, "measures focus on silvicultural prescriptions." However, a review of the hillslope stability analysis does not reveal any summary of silvicultural prescriptions and the relative magnitude of their impact on slope stability. Further, the hillslope stability analysis does not include any comparison of historical impacts by different types of silviculture to different types of geology, slope magnitude, or other slope factors.

S5-105

78. Pages 6-74 and 6-75. These pages include discussion of four specific assumptions but do not mention or propose any type of testing to validate any of the assumptions. It is critical that these assumptions be tested, because they are proposed to provide the foundation for hillslope evaluation and, ultimately, for prescription development.

S5-106

79. Pages 6-75 through 6-91 summarize mass wasting prescription zones, implementation, monitoring and assessment, identification-gradient-distance, and prescriptions. Based on our review of this summarized information, we believe that the summary is currently incomplete because it does not acknowledge the need to: 1) differentiate by geology type, 2) develop landslide inventories for all HPAs, 3) develop basemaps of adequate scale to ensure that hillslope features are not lost during use of SHALSTAB, and 4) use landslide population sizes that are representative of each geology and landslide type within each HPA. Further, the HCP proposes to use the volume of sediment delivery from clearcut areas as the baseline against which future delivery will be assessed, and suggests reducing delivery by 70% from this baseline. This is nonsense. The baseline against which management related landslide sediment delivery should be measured is background. The HCP does not propose any identification of or comparison to background rates in any HPA.

S5-107

80. Pages 6-75 through 6-91. The HCP text indicates that the volume of sediment delivery was estimated from direct field observations, but does not include any information as to whether zone of depletion measurements, zone of accumulation measurement or other appropriate criteria were used. Therefore, there is currently no way to verify the methodology(ies) used or the volumes reported.

S5-108

81. Pages 6-75 through 6-91. Figure 6-3 (Cumulative landslide delivery vs. slope gradient) and Figure 6-4 (Cumulative landslide delivery volume versus headscarp slope distance) indicate that highly variable population sets were used to generate the graphs. It is not clear whether any of the population sets were actually representative of conditions in any HPA, so it is impossible to know how reliable these graphs actually are. We also have concerns regarding statements made in the text accompanying the graphs. For example, the text states, "In the Smith River HPA Group, 80% of the delivered sediment volume came from slopes that were 70% gradient or steeper." According to Figure 6-3, this is correct. However, the graph also indicates that 90% of the delivered sediment came from slopes with a gradient of approximately 67% or

over time through the SSS Assessment, as described in AHCP/CCAA Appendix D.3.4. Accomplishing this will necessarily require years of work, which does not lend itself to the selected approach of using initial default prescriptions until more appropriate watershed- or site-specific prescriptions can be developed. Also, results from the property wide MWA may render meaningful data that might someday be used to better delineate MWPZs by geology type;

- 2.) Preliminary landslide inventories will be developed for all HPAs within the first seven years after Plan implementation, as described in AHCP/CCAA Appendix D.3.5;
- 3.) Green Diamond currently uses a 10-meter DEM provided by the USGS for its base map construction and intends to improve this resolution over time;
- 4.) Landslide populations from different geology types in the different HPAs will be evaluated as part of the SSS Assessment described in Appendix D.3.4.

Because of the difficulties in establishing background sedimentation rates, the Plan is expected to result in a 70 percent reduction in landslide-related sediment delivery from SMZs compared to comparable clear cut areas. An alternative is offered in AHCP/CCAA Appendix D.3.4 and Section 6.3.2.3 of a 30 percent increase in landslide-related sediment delivery compared to comparable areas of advanced second growth as a standard of comparison for the SSS effectiveness evaluation. Also see Master Response 16 regarding the 70 percent effectiveness goal for SSS conservation measures.

Response to Comment S5-107

The Services are not aware of, and the comment does not provide, any basis to question the methodology(ies) used or the volumes reported for sediment delivery. For the purposes of analysis, the Services and Green Diamond agreed to certain basic presumptions during the development of the Plan, and review work that would occur in the future under the Plan is expected either to affirm the use of these prescriptions or be used

to modify them within the limits of the AMRA. However, the Plan provides an additional layer of regulation that supplements all other applicable laws, and does not excuse Green Diamond from compliance with other laws and regulations. Additional measures may be necessary on a THP-by-THP basis to protect natural resources and water quality.

Response to Comment S5-108

AHCP/CCAA Section 6.3.2.3.1 describes that the initial field inventory of SSS landslides was directed to those areas where aerial photographs revealed a relatively high concentration of failures. On this basis, the Services believe it is reasonable to assume that these areas are a conservative representation of the conditions in the various pilot watersheds. For that reason, the Services believe that the initial default prescriptions are appropriate. With respect to why an 80 percent cumulative landslide delivery volume versus crown distance is an adequate threshold compared to a 90 percent threshold, the slope stability conservation measures must be evaluated in the context of the Operating Conservation Program (AHCP/CCAA Section 6.2) as a whole. The Plan focuses primarily on reduction in delivery of road-related sediment and recruitment of LWD to Plan Area aquatic resources to minimize effects on the covered species and their habitats. The relative sediment contribution from different management sources for the pilot watersheds under pre-Plan and projected post-Plan conditions is presented in AHCP/CCAA Appendix F3, Tables F3-3, F3-4, F3-5, and F3-8. See responses to Comments S2-19 and S5-77.

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Response to Comment S5-109

It is the Service's understanding that seismic modeling and quantitative hillslope stability modeling is presently beyond the standard of practice for forest management, as discussed in response to Comment S5-101. Therefore, quantitative modeling of the effects of seismicity on slope stability is also beyond the standard of practice for forest management. Currently these tools are beyond the standard of practice for practical reasons related to the high level of difficulty, cost, time, unacceptable site disturbance in sensitive areas, and questionable reliability of results that can be expected in the forested Franciscan complex terrain of the Plan Area. For these reasons, the Services believe that seismic modeling is not required here. However, if the standards of practice change during the term of the Permits, any RG reviewing forest management activities in the Plan Area will be expected to meet such standards as necessary to address applicable laws and regulations.

S5-108

steeper. This would appear to indicate that a further 10% of the total potential volume of sediment delivery could be retained by avoiding slopes ranging between 67% and 70%. This seems to be warranted in order to meet the stated goal of minimizing sediment delivery from management-related hillslope sources. This seems to be the case in other HPAs, as well, based on the information presented in Figures 6-3 and 6-4.

S5-109

82. Page 6-181. The HCP text discusses the effect that earthquakes may have on hillslope stability and states that, "In the forested environment, earthquakes of magnitude 6 or less on the Richter scale produce little, if any, visible change, and apparently no significant impact to wildlife or fishery habitat." The text also indicates that "there are no data to document that this occurred in the Plan Area." It is unclear how former statement can be made in light of the lack of any data. Clearly, different magnitudes of seismic activity will have different effects across the landscape. With regard to slope stability evaluation, it is possible and warranted to quantitatively include seismic triggering events to protect downslope receptors.

Table 1. Summary of background hillslope data and landslide/water quality issues

HPA	Topography	Primary Landslide Types	Landslide Inventory	Problematic Geology Types	Landslide/Water Quality Issues
Smith River	Highly variable, relatively steep and sharp except in coastal plain	Shallow and deep landslides	Some published data and maps available, not all areas	Weak serpentine, unconsolidated deposits, fault zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
Coastal Klamath	Highly Variable, steep and sharp	Shallow debris slides and debris flows	No known published landslide maps	Weak serpentine, unconsolidated deposits, fault zones	Significant sediment delivery to watercourses from shallow landslides. Land management affects landslide activity.
Blue Creek	Steep Terrain	Assume Shallow debris slides and debris flows	Specific data on landslides are unavailable	Foliated metamorphics, Fault zones	Land management affects shallow landslide activity and delivery.
Interior Klamath	None provided	Assume Shallow debris slides and debris flows	Specific data on landslides are unavailable	Mudstone, Schist, Fault zones	Land management affects shallow landslide activity and delivery.
Redwood Creek	Steep terrain, Unstable hillslopes	Shallow and deep landslides	Published data and maps available, most known of all HPAs	Incoherent Unit, low shear strength, unconsolidated sands, melange Fault zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
Coastal Lagoon	Moderately steep	Shallow and deep landslides	Preliminary Inventory	Melange, schist, unconsolidated deposits, Fault zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
Little River	Moderate to high relief hillslopes	Shallow and deep landslides	Preliminary Inventory	Melange, schist, mudstone, unconsolidated deposits, Fault zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
Mad River	Steep and mountainous with lowlands	Shallow and deep landslides	Published data and maps available	Melange, Wildcat Group, Fault zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
North Fork Mad River	Steep and mountainous	Shallow and deep landslides Common	Published data and maps available	Melange, highly erodible materials, Fault Zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
Humboldt Bay	Well dissected and relatively low relief	Shallow and deep landslides	Published data and maps available	Melange, Wildcat Group, Fault Zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.
Eel River	Highly variable with some steep slope segments	Shallow and deep landslides	Published and unpublished data and maps available	Melange, Fault Zones	Land management affects shallow landslide activity and delivery and may also affect deeper landslides.

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Attachment A

**(The Jahnsen Steps to Geologic Safety:
The Engineering Geology Approach)**

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REPRINT: Proceedings of the 35th Annual Meeting of the Association of Engineering Geologists; October 2-9, 1992, Long Beach, California; Pages 423-428

THE JAHNSIAN STEPS TO GEOLOGIC SAFETY: THE ENGINEERING GEOLOGIC APPROACH

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Introduction

"No man-made structure that is coupled with the ground can be regarded as entirely free from physical hazard and risk." This statement by the late Dick Jahns, renowned engineering geologist and distinguished professor at Caltech, Penn State and Stanford, is especially true of hillside terrain in seismically active regions. Since the end of World War II, such hillside terrain has been the focus of expanding development throughout the coastal ranges of California. These developments have offered a challenge to geologists and engineers who strive to make structures "hazard free", or at least reduce the risk associated with a hazard to a tolerable level. Standard procedures, analytical techniques and data bases have been developed over the years to enable the modern geologist and engineer to perform sophisticated hazard evaluations. Unfortunately, many developments continue to be plagued by geologic and geotechnical problems that could have, and should have, been recognized and mitigated prior to final project acceptance.

A lack of thorough and accurate engineering geologic and geotechnical engineering input during the initial investigative stages of these developments is frequently a significant factor in their failures. Ground failures sometimes result in billions of dollars of property damage and severe emotional distress that accompanies the loss of a home, devalued property or, in extreme cases, loss of life. Case studies of such ground failures, performed either for research, peer review or forensic purposes, frequently involve examination of previous geologic investigations that have not accurately predicted the ground failure or consequences of the failure. The consultants who have conducted these "postmortem" studies appear to have developed a higher degree of respect for the complexity of geologic and geotechnical conditions contributing to ground failures than consultants without this experience.

As reviewers of development applications for 12 communities in the San Francisco Bay area, we are continually confronted by the shortsightedness and incompleteness of many engineering geologic reports that present very little understanding of geologic hazards. The most common deficiencies we come across in the reports we review are the result of *incompetence* or *irresponsibility* on the part of the investigator(s).

Part of the *incompetence* problem is that the field investigative tasks are sometimes poorly planned and delegated to staff without adequate training in the completion of thorough engineering geologic investigations. Included with this group are some geotechnical engineers who do not understand geologic processes, and therefore do not perceive the need for, engineering geologic input. This improper approach is sometimes compounded when engineering-oriented firms use geologists who also are not qualified to conduct thorough engineering geologic studies. Typically, such an approach results in failure to fully recognize or understand hazards, or an inability to make the transition from hazard recognition to meaningful assessment of the risk associated with the hazard.

A smaller group of consultants perform their work in an *irresponsible* manner. Included with this group are investigators who are aware of a hazard, but try to downplay its significance without fully investigating the potential problem. In some cases, consultants deliberately perform a low-cost, limited scope of work, knowing that the reviewers will require additional studies at greater cost to their clients. We have seen some consultants choose to perform a limited geotechnical engineering study, knowing that the work would be insufficient, not up to the standard of care, and likely to be rejected by the city's reviewers as being inadequate. Later, using the reviewers' rejection as a lever, the consultant can then persuade his or her client to fund a full engineering geologic investigation. This normally has to be followed up with

a second geotechnical engineering study to address issues discovered during the geologic investigation!

Unfortunately, episodes like the one above are not as rare as we would like to believe. In many aspects, it seems as if the standards of investigative practice are less today than they were in the late 1960s and 1970s, after great strides had been achieved in recognition and characterization of hillside hazards. Jahns (1974) made the following statement in reference to reports submitted to Los Angeles County for review during the early days of geologic review: *"Nearly half of the reports had been submitted by people with little or no experience in geology as applied to engineering works, and at least half of them either were essentially without pertinent data or presented no more than generalized information rather crudely abstracted from the published record. Little more than one out of ten contained maps or sections that had been prepared at an appropriate scale or in suitable detail."* It is somewhat dismaying that this pattern of incomplete and poorly supported work continues to plague the profession.

Judging from the poor quality of many of the geologic and geotechnical reports we review annually, it is apparent that some geologic consultants are not aware that there is a well-defined method of conducting geotechnical investigations, and related hazard analyses, that can significantly improve investigative results. Dick Jahns spoke of this issue frequently to geology students at Stanford University during his tenure from the mid-1960s to the early 1980s. This forum provides a good opportunity to refresh all engineering geologists of the four "essential" steps of an engineering geologic investigation, as Jahns outlined over two decades ago.

The Jahnsian Investigative Steps

The engineering geologic approach contains the following four basic steps:

1. *Recognition* of local geologic conditions and recognition of any geologic hazards;
2. *Characterization* of the local conditions and hazards;
3. *Assessment* of the risk posed by the hazards; and
4. *Mitigation* of the hazard so that the subject property can be safely used.

To our thinking, these four steps are both logical and necessary. Furthermore, these steps must be performed in proper sequence: one cannot fully assess the risk posed by a hazard until the characteristics of that hazard are fully

understood. Similarly, a hazard cannot be accurately characterized unless the presence of the hazard has been recognized.

The most common hazards and constraints in the coastal regions of California are various forms of slope instability, susceptibility to strong seismic ground shaking, surface fault rupture, flooding, and expansive soil and bedrock materials. For simplicity, our discussion of the basic steps to the engineering geologic approach will emphasize the problems with development in landslide terrain. It is apparent, however, that the approach should be applied to all types of geologic hazards and conditions.

Step 1 - Recognition

It is obvious that the investigator must possess sufficient qualifications to enable hazards to be recognized. If a hazard is not recognized, then subsequent steps cannot be satisfactorily completed no matter how qualified the geologist or engineer participating in these phases. The record of case histories clearly demonstrates that many failures can be traced to deficiencies in this vital first step.

Recognition of a landslide hazard can be enhanced by performing the appropriate investigative tasks in proper sequence. First, the best available maps, historical aerial photographs and other documents should be reviewed to see what topographic features are present and to determine whether any significant geologic features have been previously mapped. Several communities possess their own set of geologic maps and, in some cases, geologic hazard maps. These documents provide a wealth of data which can help an investigator almost instantaneously become familiar with local geologic conditions. Frequently, we have found that these maps provide more accurate information than the site-specific maps prepared by the consultant as part of his investigation.

Site-specific surface mapping of geologic exposures and geomorphic features provide the second task in the hazard recognition phase. Many times, this critical task requires relatively little time to complete, and it is often the only dependable way to identify a number of potential hazards. For recognition of existing landslides, the surface boundaries and probable subsurface configurations must be determined, or at least approximated, from field observations. Figure 1 portrays the increasing level of detail and understanding that accompany a geologist's progression from topographic map and aerial photographic interpretation to site-specific mapping.

Performing both of these two tasks is critical to the geologic safety of a project. Without adequate identification of site conditions and associated hazards, the remaining three steps cannot be conducted with success.

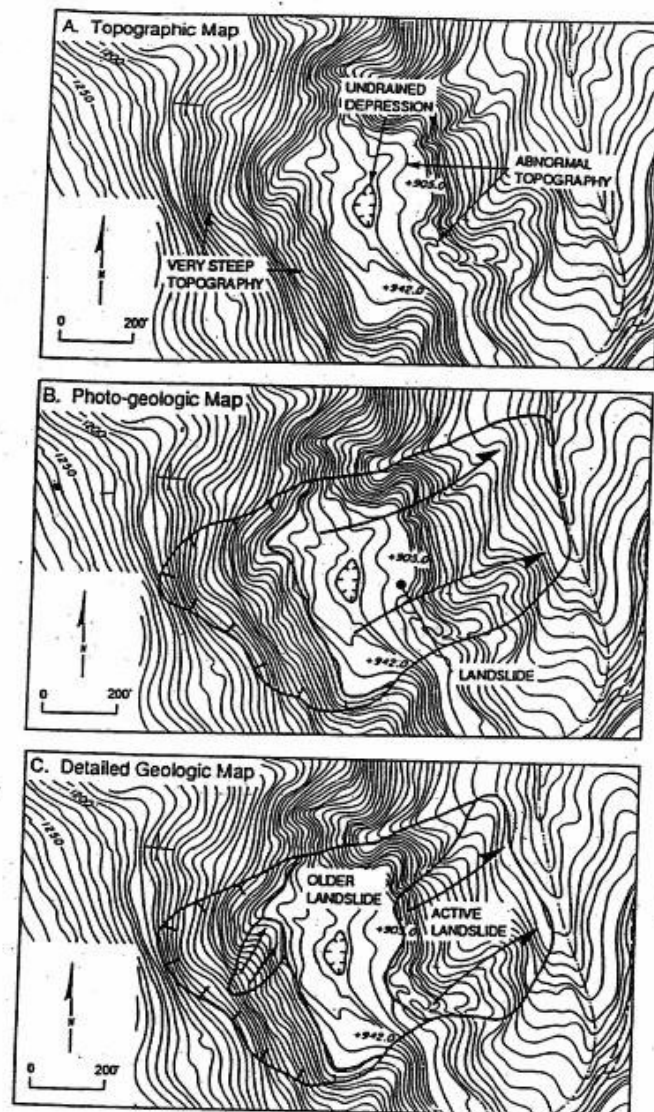


Figure 1. An example of three steps in landslide recognition, based on the use of topographic maps (A), aerial photographs (B), and geologic mapping (C).

If a hazard has not been recognized, it cannot be characterized for subsequent analysis and assessment.

Step 2 - Characterization

Once a hazard has been recognized, it requires more detailed study in order to obtain sufficient physical data as a basis for further analysis and assessment. Each type of hazard has associated parameters that must be determined before its future behavior can be judged and an acceptable assessment about risk can be made. For landslide evaluations, these parameters typically include: the physical dimensions (length, width and depth) of the landslide; topographic conditions; engineering properties of landslide materials, rupture surfaces and underlying earth materials; ground water conditions; probable modes of failure; and seismic shaking considerations. Obviously, detailed surface mapping and subsurface exploration must be carried out in order to determine these parameters.

A critical first step in this phase is the production of a detailed engineering geologic map and cross sections of the property. In hillside terrain, there is absolutely no substitute for detailed field mapping and profiling performed by an experienced engineering geologist. Unfortunately, this step is the most common missing element in an engineering geologic investigation for residential properties in hillside terrain. We often see that the mapping phase is performed hurriedly in an effort to proceed with subsurface exploration. As a result, borings and excavations are not sited in strategic locations, the significance of key materials are not recognized, and samples taken for laboratory testing do not reflect the most hazardous condition.

Prior to subsurface exploration, one or more preliminary geologic cross sections should be prepared showing the slope profile, limits of landsliding based on surface mapping, and anticipated depth(s) of subsurface rupture surfaces. Using the geologic map and preliminary cross sections, subsurface excavations can be sited at those locations that have the highest probability of achieving the needed data.

Three major objectives of the subsurface exploration program should be: complete characterization of the material units present, determination of landslide geometry, and collection of representative samples of each critical material unit for laboratory testing. We have found that a disturbing number of consultants do not follow a standard logging procedure, despite the relatively high cost and physical disruption that this phase of work can entail in comparison to other investigative tasks. Rather than attempting to maximize the amount of information from each subsurface excavation, and perhaps limiting the number of excavations, many consultants

attempt to complete as many excavations as possible in a short time frame, as if the quantity of borings or tests are a substitute for quality.

It has become clear that excavations which enable the geologist and engineer to directly observe and sample subsurface materials and contacts, such as exploration trenches and large-diameter boreholes and shaft borings that are sampled at rigid intervals without knowledge of the materials or conditions existing at (Hutchinson, 1983). Despite abundant evidence to the contrary, some of our colleagues still do not realize that landslides can consist of a sequence of stiff, or even hard, material that has failed along one or more very weak and very weak surfaces. As a result, the weakest material frequently are not sampled, and resulting stability analyses based on the high strengths determined from laboratory testing of essentially intact material yield erroneously high, and thus dangerously misleading, factors of safety.

Prior to initiation of a particularly extensive subsurface program, it is often beneficial to seek comments from the reviewer. In this way, the consultant has the opportunity to incorporate any suggestions recommended by the reviewer into his work plan, and the reviewer has the opportunity to inspect the subsurface exploration program while in progress. Communication with the reviewer can often go a long way toward completing a successful characterization of hazards affecting a particular site.

Step 3 - Risk Assessment

If the hazard characterization step is adequately carried out, the consultant is now in a position to assess the likelihood of risk that the hazard might impose on the intended land use. However, proper assessment of the risk posed by a particular hazard can not be completed until adequate hazard evaluation and analysis have been performed. In most sites, it is not possible to forecast the exact time of a geologic event. However, it is often possible to closely estimate the probable factors contributing to active geologic processes and the effects of those active processes on a particular site. In order to complete an accurate risk assessment, the engineering geologist must be aware of the conditions and sequence of events that led to formation of the hazard. Thus, for existing landslides, the engineering geologist must be cognizant of the influence of external factors such as rainfall, drainage grading, earthquake shaking, as well as possess a good idea of the mechanisms and characteristics of previous episodes of sliding. This information must then be transmitted to the geotechnical engineer so that appropriate parameters and analytical methods are used to analyze the stability of the landslide.

Even though some relatively sophisticated analytical methods have been developed to analyze slope stability, these methods can be easily misused, due to lack of data or invalid assumptions, to yield high factors of safety or low displacement computations. Consequently, the geologist must help to define the parameters used in analyses performed by the geotechnical engineer, because the geologist better comprehends the time and processes involved with hillslope evolution and landslide sensitivity to external factors. Key parameters that should be determined by the engineering geologist include landslide geometries, ground water levels, and earthquake shaking values. In addition, the engineering geologist can play a vital role in the selection of proper shear strength values, either by directly sampling the weakest materials, or by identifying which materials should be sampled for laboratory testing.

To summarize this step, following recognition and characterization of an existing landslide or other slope, a stability evaluation should be performed that incorporates the engineering geologist's understanding of: landslide type; geologic processes that may impact the stability of the slope; configuration of existing and potential rupture surfaces; orientation of bedding planes and other structural features; and any other clues from the earlier investigative phases that could aid in the prediction of future slope behavior. In addition, impacts from future development

plans (e.g., response of natural ground water levels to residential irrigation and septic leachfields) should be included in the geologic evaluation.

Step 4 - Mitigation

After the likely long-term behavior of the landslide or slope in question has been evaluated, and the associated risks to proposed development have been assessed, formulation of mitigation measures can begin. Mitigative solutions for landslide hazards include setbacks from potentially unstable ground, alterations of existing surface drainages, construction of subsurface drainage improvements, removal combined with or without reconstruction of unstable material, and various forms of retaining structures to buttress unstable slopes. The effectiveness of these and other mitigation measures are highly dependent on adequate completion of the three preceding steps. If an accurate assessment of future movement has not been performed, then the proposed method of correcting, avoiding or living with that assessment may be insufficient to prevent the adverse consequences of failure. If the mitigation measures do not adequately remedy adverse geologic conditions, then the hazard will eventually result in damage. Thus, through incomplete mitigation, the geologist and engineer can mislead their client, and the community, into a false belief that occupants of a particular property are protected from

INVESTIGATIVE STEPS	INVESTIGATIVE TASKS	PROFESSIONAL RESPONSIBILITY (Primary/Secondary)
1. Recognition	<ul style="list-style-type: none"> • Review of available maps and analysis of aerial photographs • Field reconnaissance and geologic mapping • Identification of geologic hazards 	Engineering Geologist ↓
2. Characterization	<ul style="list-style-type: none"> • Detailed geologic mapping and profiling • Preparation of preliminary geologic cross sections • Selection of strategic locations and depth requirements for subsurface exploration • Geologic logging of exploratory excavations • Collection of subsurface samples for testing • Assignment of geotechnical testing program 	Engineering Geologist ↓ Engineering Geologist/Geotechnical Engineer Geotechnical Engineer
3. Risk Assessment	<ul style="list-style-type: none"> • Synthesis of office, field and laboratory test data • Hazards evaluation (low-moderate-high) • Numerical analysis of potential hazards • Determination of risk associated with specific land-use 	Engineering Geologist/Geotechnical Engineer Engineering Geologist Geotechnical Engineer/Engineering Geologist Engineering Geologist/Geotechnical Engineer
4. Mitigation	<ul style="list-style-type: none"> • Decisions of tolerable risk and consideration of client needs, local ordinances and codes • Development and evaluation of mitigation alternatives • Disclosure of limitations associated with design options 	Engineering Geologist/Geotechnical Engineer Geotechnical Engineer/Engineering Geologist ↓

Table 1. Summary of the Jahnsian investigative steps.

the consequences of unsafe geologic conditions.

It is important for the geologist and engineer to realize that although design of stabilization or corrective measures is formulated on a technical basis, approval and implementation of mitigation measures also involves very important political, social and economic considerations. For example, a perfectly acceptable technical approach may not be viable if necessary cooperation between property owners is lacking, or if the local community has adopted ordinances restricting the amount of earth movement or construction that can take place. It is unproductive to design an engineered solution that will not be allowed due to restrictions in retaining wall heights, or other policies directed toward minimizing visual impacts. In addition, communities that have become sufficiently aware of their natural hazards generally have specific ordinances which govern acceptable land uses on various types of hazardous terrain. For the engineering geologist working in urban hillside areas of California, it should be a professional responsibility to become familiar with local regulations governing permissible land development uses and construction limitations.

Conclusions

The four steps discussed above and summarized in Table 1 form the fundamental framework of an engineering geologic investigation. These steps must be performed completely, and in proper sequence, in order for appropriate measures to be designed to mitigate a particular hazard. We should all be reminded that the approach outlined herein reflects the creed of engineering geologists. Recognition of, and action consistent with, these fundamental steps by the investigator enables the investigation to be conducted more coherently and improves the reliability of technical conclusions.

Finally, geologists and engineers should not overlook the importance of proper construction methods. Even if all four of the Jahnsian steps outlined above have been completed accurately and thoroughly, the final product may fail if implementation of the mitigation measures does not follow the design of those measures. For that reason, it is crucial that the engineering geologist and geotechnical engineer stay closely involved through completion of project construction. Close examination of final plans, geotechnical field inspections (e.g., mapping of cut slope geology, excavations for piers, measurements of cut and fill slopes, testing of fills, etc.) and monitoring of grading and foundation-construction activities must be performed by qualified personnel to ensure that the actual construction follows design, and that appropriate revisions are undertaken when unanticipated conditions are encountered. As explained by Leighton (1966), an "As-Built Geologic Map" should be prepared for developments

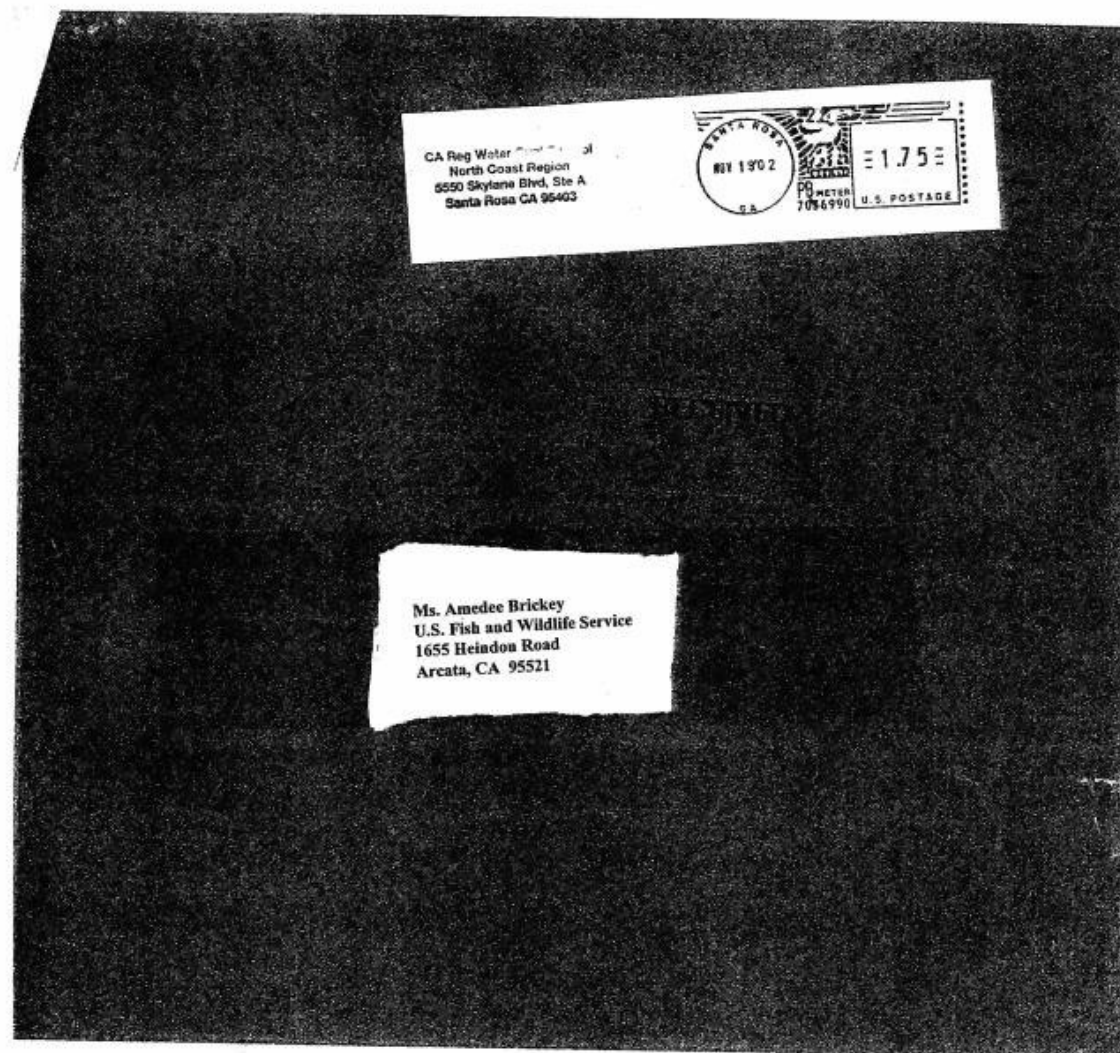
characterized by complicated geology and numerous hazards. In addition to documenting the engineer's geologist's role in project construction, this map can be used for reference during subsequent site investigations or redesign.

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CALIFORNIA DEPARTMENT OF FISH AND GAME			
NORTHERN CALIFORNIA - NORTH COAST REGION HABITAT CONSERVATION PROGRAM			
To: Amedee Brickey and James Bond			
Date: November 19, 2002			
Fax #: 707.822.8411			
Total # Pages:			
Message:			
Original cover letter and attachment were sent today by overnight mail for delivery tomorrow.			
Mark Stopher (530) 225-2275 office (530) 225-2381 fax			

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State of California - The Resources Agency

DEPARTMENT OF FISH AND GAME

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601 Locust Street
Redding, CA 96001
(530) 225-2300

GRAY DAVIS, Governor

November 19, 2002

Mr. James F. Bond
National Marine Fisheries Service
1655 Heindon Road
Arcata, California 95521

Ms. Amedee Brickey
U.S. Fish and Wildlife Service
1655 Heindon Road
Arcata, California 95521

Dear Mr. Bond and Ms. Brickey:

**Review of the Simpson Resource Company Draft
Aquatic Habitat Conservation Plan/Candidate Conservation Agreement
With Assurances (AHCP/CCAA) and Draft Environmental Impact Statement**

The California Department of Fish and Game appreciates the opportunity to review and provide comments concerning the subject Simpson Resource Company (Simpson) draft AHCP/CCAA and draft environmental impact statement (EIS). The Department submits these comments in its capacity as trustee agency for fish and wildlife resources in the State of California (California Fish and Game Code §1802). In this capacity, the Department limits its comments to those activities that fall within its area of expertise regarding fish and wildlife and to those activities associated with the AHCP/CCAA that the Department may in the future be required to approve or carry out as a responsible agency pursuant to the California Environmental Quality Act (CEQA) (California Public Resources Code, §21000 et seq.). While the EIS was prepared jointly by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service (the Services) under the National Environmental Policy Act (NEPA), the Department has not reviewed the draft EIS for legal compliance with NEPA as NEPA does not apply to non-Federal actions.

The Department notes that implementation of the AHCP/CCAA will, at a minimum, impact coho salmon and three Department species of special concern (Draft AHCP/CCAA, §1.1). The California Fish and Game Commission has determined coho salmon to be a species that warrants listing under the California Endangered Species Act (CESA) (Fish and Game Code § 2050, et seq.). Implementation of the AHCP/CCAA necessarily involves issuance of a Federal incidental take permit for coho salmon (*Id.*). The State special status and the anticipated Federal incidental take

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Response to Comment S6-1

See response to Comment S6-15.

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leads the Department to the conclusion that approval and implementation of the AHCP/CCAA has the potential to reduce the number or restrict the range of these species pursuant to CEQA (See CEQA Guidelines, §§15065, 15380). Such impacts are potentially significant under CEQA and must be addressed at some point should Simpson require either a streambed alteration agreement (SAA) (Fish and Game Code Section 1600, et seq.), or an incidental take permit (ITP) or consistency determination pursuant to CESA (Fish and Game Code §2080, et seq) (See CEQA Guidelines, §15065, subdivision (a)).

In light of the environmental impacts associated with the proposed project and the reasonably foreseeable consequences of the project, it is the Department's opinion that further Departmental review may be required regarding individual timber harvesting activities on the project site. In this regard, while the Department offers its present comments in the context of the Services' review under NEPA, we note that additional information and analysis may be required by the Department prior to any action regarding the proposed project. At that time, the Department, acting in its capacity of trustee agency and either lead agency or responsible agency pursuant to CEQA, will evaluate impacts as required by law, exercising its independent judgment and analysis.

The Department has a number of concerns regarding the potential impacts to aquatic species identified in the AHCP/CCAA. These comments are provided in this cover letter and in the enclosed "Attachment 1" (a reproduction of the draft operating conservation program [Section 6.2] with the Department's comprehensive comments and suggested revisions highlighted and incorporated into the text). These comments may be modified in future assessments, pursuant to potential application of CESA or CEQA, as more information is presented, disclosed, and/or reviewed. Absence of comment on any particular topic does not imply agreement in every case. For example, regarding specific geologic assessments or protection measures, the Department has limited its comments to clarifying questions.

In review of this AHCP/CCAA, the Department has come to appreciate the magnitude of effort invested by Simpson and the Services to incorporate a substantial amount of information into documents of a comprehensive nature. We understand the biological baseline information reflects several years of data gathering and analysis by Simpson staff. We recognize these efforts and suggest our comments be reviewed in the context of improving long-term effectiveness of the conservation measures in providing improved, fully sustainable habitat conditions for the coho salmon, chinook salmon, steelhead, coastal cutthroat trout, southern torrent salamander, and tailed frog (Covered Species).

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Response to Comment S6-2

The Services believe that Green Diamond has satisfied the ESA Section 10(a)(2)(A)(i) requirement that a conservation plan specify "the *impact* which will likely result from" any taking proposed to be authorized by the Permit. See Master Response 9 regarding quantification of take. Because NEPA does not require an environmental document to estimate levels of take in terms of number of species or habitat units, the EIS satisfies NEPA requirements in this regard.

Response to Comment S6-3

The Department correctly concludes that the Operating Conservation Program includes the enforceable provisions of the Plan. However, this does not mean that the goals and objectives (AHCP/CCAA Section 6.1, discussed in Master Response 12) or Green Diamond's timber operations and other forest management activities are irrelevant. To the contrary, the biological goals and objectives guided the development of the Operating Conservation Program and would be used again to guide any measures subsequently deemed necessary. The Operating Conservation Program (AHCP/CCAA Section 6.2) provides an additional layer of requirements that govern activities in the Plan Area independent of other applicable laws and management policies (see AHCP/CCAA Section 1.4 and EIS Sections 1.5 and 1.6), such as the California ESA, Federal and State water quality laws and the CFPRs. The entire Plan gives context to the Operating Conservation Program, so it is not irrelevant by any means.

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Environmental scientists from the Department's Coastal Timberland Planning office have been involved in significant pre- and posttimber harvesting inspection efforts on Simpson lands for several years. These scientists are familiar with each of the hydrologic plan areas (HPAs) and the riparian and road conditions present in many HPA watersheds. Our comments with regard to these landscape features are informed to a significant degree by observations of channel and near-channel conditions in hundreds of Class I, II, and III watercourse reaches, nearby harvest units, and completion of numerous appurtenant road evaluations covering several hundred road sediment delivery sites.

General Comments Regarding the Draft AHCP/CCAA:

S6-2 The proposed plan will have far-reaching effects as it covers over 416,000 acres in Humboldt and Del Norte counties. The plan area encompasses a large portion of each species' range and several salmonid evolutionarily significant units (ESUs). As such, management activities specified in the plan have great potential to impact important spawning and rearing habitat for the covered salmonids and amphibians. However, estimates of expected take levels for Covered Species in terms of number of animals or habitat units are not stated in the draft AHCP/CCAA or in the draft EIS. Uncertainty in the anticipated level of take in these aquatic species and the declining status of several of the Covered Species increases the need for the Department to seek protection and mitigation measures that will prevent further decline and be compatible with recovery of the species. Particular attention was given to the plan's potential impact on coho salmon, a Federal and candidate State-listed threatened species throughout the proposed plan area.

S6-3 Section 3.8 of the Implementation Agreement appears to state that only the Operating Conservation Plan, specifically delineated in Section 6.2 of the AHCP/CCCA, is required and therefore enforceable. The implications of this with respect to other sections of the document are not clear. Does this mean, for example, that Section 2 which describes Simpson's timber operations and forest management activities or Section 6.1 which describes biological goals and objectives will not be relevant once the AHCP/CCCA is approved?

The Department submits that the proposed plan requires modification in order to satisfy the overall biological and regulatory requirements of coho salmon and the other Covered Species. The Department's recommended changes to the conservation measures contained in Volume 1, Section 6.2 will help to ensure that the AHCP/CCAA will:

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Response to Comment S6-4

Cumulative effects have been discussed in Master Response 3. The rate of harvest and the concept of a disturbance index have been discussed in Master Response 11.

Response to Comment S6-5

Disturbance index has been discussed in Master Response 11. Cumulative effects have been discussed in Master Response 3.

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1. reduce the magnitude of existing significant adverse cumulative watershed effects that persist in the plan area,
2. minimize and mitigate the forestry related impacts associated with any authorized incidental take of the Covered Species to the maximum extent practicable, (per Federal Endangered Species Act (ESA) incidental take permit issuance criteria),
3. minimize and fully mitigate the impacts of the take potentially authorized under a future CESA permit,
4. mitigate to a level below significant the impacts associated with any defined forestry activities that would result in reducing the number or restricting the range of the Covered Species, (per CEQA), and
5. significantly reduce, over time, those factors which may in the future limit fully functioning habitat for the Covered Species.

S6-4

In addition, the implementation of the conservation measures should include timber harvesting at an appropriate temporal and spatial scale in order to feasibly reduce potential significant adverse cumulative watershed impacts. The Department understands that Simpson currently practices even-aged harvests of conifer stands at approximately 50-60 years of age. Over the 50-year life of the proposed plan, it is assumed that the entire plan area (with the exception of trees retained along watercourses in steep unstable locations and in habitat retention areas) would be even-aged harvested one time. The past harvest history of major portions of the plan area has resulted in a stand-aged distribution of harvest-aged stands concentrated within a subset of HPA watersheds rather than evenly spaced across the plan landscape. Such a distribution will continue to subject many watersheds to highly concentrated disturbance (even-aged harvesting, road construction, and burning) potentially over a very short time period (e.g., less than 10 years).

S6-5

The proposed AHCP/CCAA does not contain a disturbance index model to monitor and potentially limit the amount of recently even-aged harvested stands and miles per square mile of roads (particularly nonupgraded and nondecommissioned roads) in each HPA. The only constraint on temporal and spatial harvest rate is conformance to stand adjacency specified in the California Forest Practice Rules (FPRs). Without a more specific methodology to assess and govern rate of harvest and reduce road density, the AHCP/CCAA may not be able to avoid perpetuation of existing cumulative watershed impacts with the net result being a trend away from recovery of the covered salmonid species.

Additional concerns with regard to the draft EIS and AHCP/CCAA include, but are not limited to, the following:

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Response to Comment S6-6

See Master Response 18. See also the response to Comment R1-51 regarding hardwood dominated streams.

Response to Comment S6-7

The Services are not authorized to require the applicant to include different measures than those proposed. The development of the suite of measures is a matter of the Permit applicant's discretion (HCP Handbook at 3-19). The Services' role in designing the conservation program is to "be prepared to advise" during the development of the AHCP/CCAA and to judge its consistency, as a whole, with the ESA approval criteria once the application is complete (HCP Handbook at 3-6 and 3-7). The ESA does not require that any particular measure be adopted or imposed, but only that its criteria for Permit issuance be met. Issuance criteria are discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1 and Master Response 8. The Services believe that the Plan meets these criteria. Plan enforceability has been discussed in Master Response 14.

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Conifer Retention

There appears to be an inadequate conifer retention strategy for Class I and larger Class II riparian management zones (RMZs) which are dominated by hardwoods. For example, the AHCP/CCAA states if the inner Class I riparian management zone is predominantly composed of hardwoods (it contains less than 15 conifer stems per acre that are greater than 16 inches dbh) Simpson will take no conifers from the inner zone, and no harvesting within the RMZ will be undertaken that would reduce the conifer stem density within the RMZ to less than 15 conifer stems per acre. Neither Chapter 4 of the draft EIS nor the AHCP/CCAA provides sufficient analysis stating why/how this level of retention is adequate for large woody debris (LWD) recruitment.

The Department does not agree 15 conifer stems per acre greater than 16 inches dbh is necessarily adequate for LWD recruitment or other riparian functions in many inner or outer Class I RMZs, particularly those dominated by hardwoods. The language, as proposed, could allow harvesting of conifer stems down to 15 per acre greater than 16 inches dbh as long as the steep streamside slope (SSS) provisions, likely to recruit criteria, and overstory canopy minimums (which include hardwoods) are met. In areas not subject to SSS provisions, where there are few recruitable conifers and where conifer overstory canopy is lacking, it appears harvesting at these levels will perpetuate alder or other hardwood domination and significantly retard conifer recovery in the RMZs for at least the life of the AHCP/CCAA. Moreover, if the adjacent slope is subject to even-aged harvest, significant blowdown of both conifer and hardwood could occur in these poorly stocked RMZs, further delaying development of stands capable of contributing whole tree conifer LWD.

Additionally, an adequate and more comprehensive conifer retention strategy is recommended for the larger, high energy, hardwood dominated Class II watercourses in the plan area.

Treatment for Road-Related Sediment

Although a significant effort and well prioritized by watershed, the Department believes the reduction of road-related sediment delivery requires a commitment to an enforceable rate of sediment reduction per year. The road upgrading and decommissioning currently proposed would also improve by a commitment to treat a minimum number of sites and miles of road upgraded and decommissioned per year. There should also be a commitment to reduce high and moderate priority sites to fully treated or "non" sites, (i.e., sites that no longer deliver sediment to streams or infrequently deliver amounts small enough as not to be considered cumulatively significant). Additionally, although Simpson has stated intent to treat low priority sites

S6-6

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Response to Comment S6-8

Roads and sites will be prioritized for treatment based on future sediment delivery, treatment immediacy, and treatment cost-effectiveness. The only real subjective aspect of the prioritization process is the treatment immediacy which is the probability that delivery will occur and the amount that will deliver. However there is an established process where different crews would essentially come to the same conclusion of priority. There are both training and supervisor oversight of the crews that help maintain consistency. In addition, the assessment work is conducted in a crew of two so differences in classifications can be identified and corrected if necessary.

The Services agree that treating high and moderate risk sediment delivery sites does not eliminate the risk of crossing failure; however, it significantly reduces the probability that they will fail or deliver sediment. Treatment of high and moderate risk sediment delivery sites also includes hydrologically disconnecting the adjacent road (although potentially only ranked as a low risk sediment delivery site) associated with the crossing to minimize potential chronic sediment inputs. The Services emphasize that the treatment of high and moderate risk sediment delivery sites to reduce them to low risk site status does not mean that part of the site is untreated. Each of the high and moderate risk sites will be completely treated. However, the reclassification of the site to a low risk status is a way of acknowledging that treatment of a site does not completely eliminate the risk of failure. The treated site still represents a "site" - albeit a low risk one without treatment requirements. All the sites along a section of road that are to be decommissioned will be treated, including low risk sites. However the low risk sites along the road do not count toward the estimate

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during road decommissioning operations, it remains discretionary and not enforceable under the plan. This intent should be an enforceable commitment to treat all low priority sites that show signs of chronic delivery or have the potential to become moderate or high sites if left untreated.

The Department interprets low priority sites as those that may still deliver sediment to watercourses chronically or episodically. There can be considerable subjectivity in assigning low, moderate, or high values to the sites, based mainly on likelihood of the site to deliver, but also by the estimated amount versus cost per cubic yard of sediment saved. The margin of error in making these subjective estimates can be significant. A site that is chronically delivering fine sediment may be considered low priority on the basis of sediment saving by cost estimate, but it may have a moderate to high potential for significant impact over time.

By treating only some of the high and moderate sites over the first 15 years of the plan and treating them only enough to reduce them to low site status, Simpson's sediment objective may be achieved. However, the treated sites may still deliver cumulatively significant amounts of sediment. Treatment of low sites will apparently be optional and these could remain untreated throughout the life of the plan. Failure to treat these sites may add to existing significant cumulative sediment effects to the Covered Species and their habitats in watersheds throughout the plan area.

Effectiveness Monitoring

Measures for monitoring plan effectiveness and for the development of thresholds for adaptive management should rely less on maintenance of current conditions in the managed plan area and more on desired outcomes that indicate attainment or improvement toward desired habitat conditions. Current conditions in the plan area are often indicative of substantially impacted habitat characteristics and populations due to the cumulative effect of both historic and recent activities. Therefore, using maintenance of current conditions across the managed landscape as the standard may preclude recovery of listed species and does not reduce the risk of future listing of other Covered Species. In view of the threatened status of salmonid Covered Species, a program based on trending toward desired habitat conditions would be most appropriate and compatible with the intent of the Federal and State program objectives defined in the AHCP/CCAA and the first paragraph of this letter.

The draft EIS states the proposed plan would "improve the overall condition of habitat for the Covered Species in the Action Area." To support this objective, hypothesis testing and adaptive management thresholds should include statistical analyses centered on assessment of significant improvement of parameters monitored as compared to areas harvested prior to implementation of the proposed plan.

of future sediment yield or toward Green Diamond's monetary commitment to provide \$2.5 million per year on treating high and moderate risk sediment delivery sites.

Response to Comment S6-9

The monitoring and adaptive management programs are not designed to maintain current conditions. As discussed in Master Response 1, current conditions in many Plan Area streams have been heavily impacted due to past activities. However, data provided in the Plan lead the Services to believe that implementation of the Operating Conservation Program in the Plan Area will improve habitat conditions for the covered species. The Services believe that the Plan meets the issuance criteria, see Master Response 8, including the requirement to not reduce the likelihood of the survival and recovery of the species in the wild.

Response to Comment S6-10

The Services believe the monitoring program in the Plan (AHCP/CCAA Sections 6.2.5 and 6.2.7) will accomplish what the comment suggests. Most of the monitoring projects proposed in the Plan have already been initiated, and the remaining portions will begin concurrent with Plan approval and issuance of the Permits.

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Response to Comment S6-11

The Services agree that active participation by the permitting agency throughout the 50-year term of the Permits would help to ensure the success of the Plan. The Services will utilize our existing authorities under the ESA, sections 9, 10, and 11, as well as the dispute resolution process described in the IA (Paragraph 13.6) to address Plan implementation and Permits issues as they arise.

Response to Comment S6-12

The AMRA, including how it is funded, its opening balance and how it may change, and how it would be used under the Plan to benefit the covered species and their habitats, is discussed in AHCP/CCAA Sections 6.2.6.3 and 6.3.6.2, as well as in Master Response 15. The Services have found that the AMRA is adequate for the purposes provided in the Plan.

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Consultation and Revision of Initial Default Parameters

There are several instances where revisions to the "Operating Conservation Program" could occur but consultation with the Services has not been clearly articulated as a component. One instance where the Services' input would be essential is in the planned changes of the initial defaults of minimum slope gradient and maximum slope distances through analysis of data from the "Steep Streamside Slope (SSS) Delineation Study."

The Department understands that revisions in the initial default SSS slope gradients and distances for individual HPAs will occur when more data is available. Apparently, these revisions will be accomplished in an effort to provide protection measures tailored to prevention of sediment delivery based on existing slide characteristics. However, the anticipated time frame of approximately six or seven months for data collection, analysis, and the adoption of new initial default slope gradients and slope distances for each of the 11 HPAs in order to meet completion in seven years, may be insufficient for careful internal verification and consideration of data or peer review of methods and data interpretation. A basic consideration that should be opened to peer review is whether a sample of existing slides across an HPA is sufficient to determine necessary protection measures. Revision of these initial defaults, without defined limits and without the Services' approval, results in a high level of uncertainty that these measures will minimize and mitigate take to the maximum extent practicable.

The Department recognizes that some decisions about plan operations can be determined only after new information becomes available, but active participation by the Services in the decision making process is a key element to plan success.

Adaptive Management Reserve Account

It is not apparent to the Department that the initial 1,550 fully stocked acre balance of the "Adaptive Management Reserve Account" (AMRA) will be sufficient to ensure that adaptive management can be used effectively for the full term of the plan. This opening balance is less than 0.4% of the initial plan area of 416,531 acres. Since protection measures of both the RMZ and the SSS (which includes the riparian slope stability management zone and the slope stability management zone) zones are subject to modification through adaptive management, it would appear that the opening balance should reflect both RMZ and SSS acreage. It has not been demonstrated that this opening balance ensures adequate funding to be available for implementing measures required to minimize and mitigate the impacts of authorized take.

S6-11

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Response to Comment S6-13

The development of the suite of measures, including any dispute resolution process, is a matter of the Permit applicant's discretion (HCP Handbook at 3-19). The Services' role in designing the conservation program for an HCP is to "be prepared to advise" during the development of the plan and to judge its consistency with the ESA approval criteria once the application is complete (HCP Handbook at 3-6 and 3-7). The ESA does not require that any particular measure be adopted or imposed, but only that its criteria for Permit issuance be met. Issuance criteria are discussed in EIS section 1.3, AHCP/CCAA Section 1.4.1 and Master Response 8. The Services believe that the Plan meets these criteria, and the commenter provides no information to suggest otherwise.

Response to Comment S6-14

Numerous changes to Plan and EIS glossary definitions have been made pursuant to suggestions made by the commenter and others. See responses to Comments S1-103 through S1-169.

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Specific Comments Regarding the Draft AHCP/CCAA:

As Section 6.2 of the AHCP/CCAA contains all of the conservation measures considered the enforceable part of the plan, the Department has focused most of our detailed comments on that section. These comments are highlighted within the original text of a reproduced version of Sections 6.1 and 6.2. **Please refer to Attachment 1 for the specific comments on Volume 1, Section 6 (Conservation Program).**

The Department submits the following specific comments in addition to the above-referenced enclosed Attachment 1.

A dispute resolution process is outlined in Section 6.2 of the AHCP/CCAA (with link to the Implementation Agreement) which appears to be neither compelling nor likely to be effective in resolving substantive issues. An effective dispute/issue resolution process mandates all parties to resolve issues at the lowest level and within an efficient time frame. A more comprehensive dispute/issue resolution process is essential for such a complex and long-term agreement.

Both the draft EIS (Glossary) and AHCP/CCAA (Definitions), contain definitions of various terms used throughout the documents comprising this draft plan agreement. Unfortunately, many of the terms found throughout these documents are defined differently in the Glossary and Definitions locations. There are also several other terms that should be defined, but are not. Over time, this will likely lead to confusion, disagreement, and a less effective plan for all parties.

Examples of the terms omitted from but necessary for inclusion in the Glossary and Definitions include:

Primary Road, Secondary Road, Potential Recruitment,
Stand, Stocked, and Managed Potential Tree Height.

Examples of the terms with different definitions in the Glossary and Definitions sections include:

Class I, Class II, and Class III watercourses,
Embeddedness, Equipment Exclusion Zone, Incidental
Take Permit, Inner Gorge, Large Woody Debris, Listed
Species, Precommercial Thinning, Sediment, Seep,
Silviculture, Single Tree Selection, Take, Unforeseen
Circumstances, Unlisted Species, Watercourse, and
Yarding.

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The term, Species of Special Concern is also defined but appears to be used inconsistently within the document(s) and within other definitions.

The Department views the proposed AHCP/CCAA (in particular the Operating Conservation Program), if appropriately modified, as a process by which impacts to the Covered Species can be sufficiently mitigated and their habitats may trend towards recovery. The degree to which recovery may occur will depend on a combination of uncontrollable and controllable factors. The uncontrollable factors include stochastic occurrences such as major storm events, large earthquakes, wildfire, and oscillations in weather patterns and ocean conditions. The controllable factors include the type, magnitude, locations, rate, and timing of timber operations (which are only partially disclosed in this draft) only some of which are proposed to be made enforceable under the Operating Conservation Program. All controllable factors (conservation measures) in Section 6.2 need to be as favorable to the Covered Species and their habitats as practicable over the 50-year term of the plan while providing economic viability and operational flexibility for Simpson.

In closing, the Department appreciates the opportunity to participate in the Services' NEPA review of the AHCP/CCAA and encourages full consideration of these comments and implementation of the proposed changes. We believe such an effort will benefit all concerned in the context of the Department's future permitting obligations. We look forward to working with the Services and Simpson, should Simpson seek coverage under CESA pursuant to Article 3, §2080, et seq; of the Fish and Game Code. The Department will continue to provide pre- and postharvesting input on individual timber harvesting plans as a member of the interdisciplinary review team under the FPRs and through the SAA process.

Please direct questions or comments to Mr. Mark Stopher, Habitat Conservation Program Manager, telephone (530) 225-2275, or Mr. Kenneth Moore, Senior Environmental Scientist, Coastal Timberland Planning office, at (707) 441-5670.

Sincerely,


for DONALD B. KOCH
Regional Manager

Enclosure

cc: See page ten

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